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CHILDHOOD MORTALITY FROM ACCIDENTS

by age, race, and sex and by type of accident

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CHILDHOOD MORTALITY FROM ACCIDENTS

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Today accidents are the leading cause of death among children over one year of age. Medical knowledge in the last decades has greatly reduced the number of deaths from other causes, such as the acute infectious diseases and tuberculosis, but in accident prevention we have failed to keep pace with our increasing industrialization and mechanization.

There is no doubt that the great majority of these accident deaths could be prevented. If we are to reduce this wastage of child life, we must have more widespread appreciation of the problem and more precise knowledge of the types and causes of accidental deaths. For this reason the Children's Bureau has made a study of the death rates for specified types of accidents among children and adolescents, based on data from the Bureau of the Census for the years 1939, 1940, and 1941. The study was made by Dr. George Wolff, a member of the Division of Statistical Research of the Children's Bureau and formerly Director of Medical Statistics in the Berlin Health Administration and Lecturer at Berlin University on Social Medicine. Special emphasis has been put on age, sex, and race differentials for all kinds of accidents. These reflect the differing risks—due to physiological, psychological, and environmental differences—of the sexes and races and suggest methods of prevention by special training and education.

Almost 20 thousand boys and girls die from accidents each year. This is a continuing, peace-time death toll that can and must be reduced. To save these lives—by education, sanitary engineering, traffic controls, and socio-economic changes—is worth every effort we can make.

Katharine F. Lenroot

Chief, CHILDREN'S BUREAU.

CHILDHOOD MORTALITY FROM ACCIDENTS

by age, race, and sex, and by type of accident

Since the turn of the century accidents have become relatively more and more important as a cause of death in childhood. Today they occupy a place similar to that held in former decades by infectious diseases. To be sure, the death rate from accidents, including motor-vehicle accidents, has never equalled and probably never will equal the high rates reached by tuberculosis, diphtheria, or diarrhea and enteritis, in the past. But at present accident prevails over most other causes of death in childhood and therefore forms a new problem in public health and the prevention of avoidable deaths. There is no question but that the majority of these deaths from accident are preventable by one means or another—education, sanitary engineering, or socio-economic changes.

For this reason it is of general interest to inquire into the details and differentials of accident fatalities. Material for such differentiation has been prepared in the Children's Bureau for the 3-year period 1939-41, by age, race, and sex. The average annual death rates are computed for the enumerated population of the census of 1940 and are based on mortality data from the United States Bureau of the Census for the single years 1939, 1940, and 1941. The 3-year average has been taken, to diminish chance fluctuations. Standard errors were computed for all rates to test the validity of the finer differences, especially sex and race differences, for different kinds of accidents. In some instances they are shown and discussed in the text.

Table 1 gives, first, the death rates per 100,000 population for all accidents, by age and sex, for white and nonwhite children under 20 years of age and, second, the population numbers on which these rates are based. In addition, ratios of the death rates, nonwhite to white and male to female, are shown in the same table.

It is noteworthy that in both racial groups the death rate for accidents is higher during infancy than in any of the following age groups of childhood (1-4, 5-9, 10-14, 15-19 years). In both racial groups the lowest rate for boys occurs in the age group 5-9 years, and for girls, in the age group 10-14 years. It should also be mentioned at once that throughout all ages of child-

hood the male exhibits distinctly higher death rates for accidents as a whole than the female. Finer differences and exceptions will be discussed later.

For the white population under 20 years of age, the average annual death rates for accidents in the period covered are 56.3 for boys and 25.3 for girls, per 100,000 of each sex. This gives a sex ratio, boys to girls, of 2.2. The absolute numbers corresponding to these rates, 34,129 and 14,916 for boys and girls respectively, give a better idea of the amount of human life lost through accidents in the promising years of childhood.

For the nonwhite group the death rates are 74.2 and 36.3 for boys and girls respectively, a sex ratio, boys to girls, of 2.0, with the corresponding absolute numbers of 5,976 and 2,990. Thus the death rates for accidents are somewhat higher for the nonwhite group than for the white, while the sex ratio is somewhat lower. These sex and race differences are, of course, statistically significant since the rates are based on the huge population of the total United States, the numbers for children under 20 years being around 20 million for each sex in the white, and 2.7 million for each sex in the nonwhite population.

A more detailed view of race and sex differentials for accidental deaths is obtained by computing the race and sex ratios by ages as shown in table 1. Nonwhite infants of both sexes suffer from fatal accidents more than twice as often as white infants. In the other age groups the race differences are not very great, the lowest ratio, nonwhite to white, being 1.1 and the highest 1.4.

The sex difference in both racial groups shows a more consistent trend. Low in infancy and preschool age, and lower among nonwhite than white children, the difference between the sexes increases in the age group 5-9 years, when white boys show twice as many fatal accidents as white girls, and rises appreciably higher in the subsequent groups 10-14 and 15-19 years. In the last group white boys suffer nearly four times as many fatal accidents as white girls, and among nonwhite children the boys have a still higher ratio.

After this short introduction it will be appropriate to consider systematically the details of accidental deaths available in the data. Naturally, the greatest interest lies in the types and causes of accident dominant in the different age groups. In the following tables accident fatalities are grouped according to the International List of Causes of Death (Fifth Revision of 1938); the numbers of the List associated with the single causes of accidental death are shown in brackets. As before, death rates are computed for principal accidents, or accident groups, by age, sex, and race per 100,000 population; absolute numbers of deaths in the 3-year period 1939-41, and ratios of the death rates, nonwhite to white, are given in corresponding tables. (See tables 2, 3, 4, 5, 6.)

Among white children in all age groups except the infant year, the death rate for motor-vehicle accidents exceeds the rate for every other type of acci-

TABLE 1.—Childhood mortality from accidents by age, sex, and race; United States, 1939-41. Average annual rate per 100,000 population in each age-sex group.

Race	Age groups in years											
	Under 20		Under 1		1-4		5-9		10-14		15-19	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
White	56.3	25.3	124.0	97.8	56.6	41.1	39.3	20.0	40.9	12.2	74.1	19.8
Nonwhite	74.2	36.3	259.1	208.1	66.2	57.9	42.6	26.7	56.2	14.5	98.1	21.1
	Ratios: Nonwhite to White											
	1.3	1.4	2.1	2.1	1.2	1.4	1.1	1.3	1.4	1.2	1.3	1.1
	Ratios: Male to Female											
White	2.2		1.3		1.4		2.0		3.4		3.7	
Nonwhite	2.0		1.2		1.1		1.6		3.9		4.6	

Population of children under 20 years by age, sex, and race; United States, census of 1940

Age groups (years)	White		Nonwhite	
	Male	Female	Male	Female
Under 20	20,220,934	19,654,264	2,685,179	2,745,227
Under 1	906,897	871,336	119,903	122,038
1-4	3,794,573	3,656,699	533,435	536,643
5-9	4,744,537	4,584,414	674,286	681,385
10-14	5,259,007	5,093,688	693,322	699,918
15-19	5,515,920	5,448,127	664,233	705,243

dent. For the nonwhite group automobile accidents do not have the same relative importance among other accidents. Motor-vehicle accidents constitute one of the few causes of death for which nonwhite young children and adolescents exhibit lower death rates than the white. (See ratios, nonwhite to white, table 4.) The lower rate of the nonwhite children in this respect calls to mind the fact that a relatively larger proportion of them live in agricultural parts of the country and for this reason may not be exposed to traffic hazards to the same degree that white children are.

Fatal Accidents in Infancy

The accident death rate is higher in the first year of life than in any subsequent age group of childhood. The average annual rates in 1939-41 were 124.0 and 97.8 per 100,000 for white boys and girls respectively; the corresponding rates for nonwhite infants being 259.1 and 208.1. Thus it is obvious that in both sexes the nonwhites lose relatively more than twice as many lives as the whites from accidents in the first year of life. The higher mortality of the male infant is likewise obvious in both racial groups. The sex difference is significant, even in the nonwhite group, although the absolute numbers of infants are comparatively small (around 120,000 of each sex in the nonwhite and 900,000 of each sex in the white population). An explanation for this sex difference in early infancy is difficult to find. Perhaps an examination of the single causes of accidental deaths will shed some light on this striking result of biological statistics.

A glance at tables 2 and 3 will show that by far the most important cause of accidental death in infancy is *mechanical suffocation.* The death rates for the white infants, 57.7 and 45.0 for male and female respectively, and the corresponding rates for the nonwhite infants, 112.9 and 98.9 respectively, constitute almost one-half of the total deaths from accident in both races and sexes.[1] The race differential might be explained by the more favorable en-

[1]A similar conclusion regarding the importance of mechanical suffocation as a cause of accidental death in infancy was reached by William M. Gafafer in his geographical-statistical studies on fatal accidents for the years 1925-32. The proportion of deaths from mechanical suffocation among all accidental deaths, though more than one-third, was still not as high as in the period covered by the present study. According to Gafafer, in the United States death registration area mechanical suffocation accounted, in 1932, for 687 deaths out of 1,921 accidental deaths among infants under 1 year, or 36 percent of all accidental deaths. (See U. S. Public Health Reports, Vol. 51, No. 48. November 27, 1936.) The increasing number of infants who die from this cause of accidental death has been emphasized by Harold Abramson: Accidental Mechanical Suffocation in Infants, The Journal of Pediatrics, 25:404-413, 1944. According to the author the absolute numbers of these deaths increased in the registration States from 692 in 1933 to 1,333 in 1942. The increase holds true even when the birth increase is considered; the rate per 1,000 live births rose from 0.33 in 1933 to 0.47 in 1942.

TABLE 2.—Death rates for accidents in childhood by age, sex, and race; and by type of accident; United States, 1939-41. (Average annual death rates[1] per 100,000 population)

Type of accident (Numbers of International List of Causes of Death, Fifth Revision of 1938)	White											
	Under 20 years		Under 1 year		1-4 years		5-9 years		10-14 years		15-19 years	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
ALL ACCIDENTAL DEATHS (169-195)	56.3	25.3	124.0	97.8	56.6	41.1	39.3	20.0	40.9	12.2	74.1	19.8
Railway accidents (except collisions with motor-vehicles) (169)	1.1	0.2	0.1	0.0	0.5	0.3	0.6	0.3	1.1	0.3	2.1	0.2
Motor-vehicle accidents (170a, b, c, d)	21.8	9.7	7.4	7.2	15.6	11.3	17.8	9.3	14.6	5.2	38.6	13.7
Streetcar and other road-transport accidents (171a, 171b)	0.5	0.2	0.1	0	0.3	0.2	0.4	0.2	0.7	0.2	0.6	0.1
Accidents in mines and quarries (174)	0.3	0.0	0.0	0	0.0	0	0.2	0.0	0.2	0.0	0.8	0.0
Agricultural accidents (175a, b, c)	1.0	0.1	0.0	0.0	0.8	0.3	0.5	0.2	1.1	0.1	1.6	0.0
Other accidents involving machinery (176)	0.4	0.1	0	0	0.3	0.1	0.2	0.1	0.2	0.0	0.9	0.0
Food poisoning (177)	0.4	0.4	2.4	2.3	0.9	1.0	0.2	0.1	0.1	0.1	0.1	0.1
Acute accidental poisoning (except food poisoning) (178, 179)	1.2	1.0	2.8	2.3	4.1	3.3	0.3	0.3	0.2	0.2	0.6	0.6
Conflagration (180)	1.3	1.1	4.3	3.9	3.4	2.3	1.1	1.2	0.5	0.5	0.5	0.4
Accidental burns (except conflagration) (181)	3.1	3.7	7.6	6.4	9.2	10.3	1.7	3.8	1.0	1.3	1.2	0.9
Accidental mechanical suffocation (182)	2.9	2.1	57.7	45.0	0.6	0.4	0.3	0.1	0.2	0.0	0.2	0.0
Accidental drowning (183)	8.8	2.1	1.8	1.5	9.6	4.2	8.1	1.3	8.9	2.0	9.8	1.4
Accidental injury by firearms (184)	3.3	0.5	0.2	0.0	1.0	0.5	1.5	0.6	4.3	0.5	6.1	0.6
Accidental injury by fall (186a)	2.9	1.0	5.9	3.7	3.2	2.0	2.2	0.8	2.5	0.7	3.1	0.5
Other accidents	7.3	3.1	33.9	25.4	7.1	4.6	4.2	1.8	5.3	1.3	7.8	1.1
Obstruction, suffocation, or puncture by ingested objects (195d)			20.6	15.7								

[1] Symbol 0 means no death at all; 0.0 death rate less than 0.05.

vironment of the white family. But the fact that both white and nonwhite boys suffocate by heavy bedclothes or other overlying obstacles more frequently than girls do, can hardly be explained by greater risk.

Among nonwhite infants the sex difference is not significant in a strict, statistical sense and could be due to chance fluctuations; not so among the white, and both differences lie in the same direction. The only explanation seems to be a different mental or bodily constitution of the sexes evident from early infancy, perhaps an inborn tendency in the male to greater activity or perhaps to lower resistance.[2] There may be many factors which combine to determine the inborn differences of the sexes and which also manifest themselves in the differentials of accident mortality.

The higher mortality of the male infant also holds for the second most important cause of accidental death in infancy, *obstruction, suffocation, or puncture by ingested objects.* This classification is contained in the collective group "other accidents," which comprises such different causes of death as cataclysm; injury by animals; hunger or thirst; excessive cold; excessive heat; obstruction, suffocation, or puncture by ingested objects. The last subgroup (195d of the International List) is especially large in infancy and is the main reason why the death rates for "other accidents" are so much higher for this age than for any other age group of childhood. The death rates for obstruction, suffocation, or puncture by ingested objects are isolated in our tables for the infant year; they are 20.6 and 15.7 for white boys and girls respectively, and 24.5 and 16.7 for the nonwhite. In both racial groups this cause of death is second only to mechanical suffocation. The differences between the races are slight, but the sex differences, pointing in the direction described above, lie beyond the probable limits of chance fluctuation.

The next leading cause of accidental death in infancy is *accidental burns.* The death rates when compared with those for suffocation are rather low among the white, 7.6 and 6.4 for boys and girls respectively; among the nonwhite they are 20.6 and 16.4 respectively. For this particular item the differences between the sexes are not significant from a strictly statistical point of view, in either race, but the racial differences are significant and high, probably due to different environmental hazards in the white and nonwhite family.

Among white infants, the fourth leading cause of accident fatalities is *motor-vehicle accidents* with 7.4 and 7.2 deaths per 100,000 boys and girls respectively; the corresponding rates for nonwhite infants being 6.4 and 6.3 respectively. For this item there is no sex differential of any significance and the race differential is in favor of the nonwhite group, as mentioned in the introductory remarks on accidents in general. Among nonwhite infants the fourth principal cause of accidental deaths is *conflagration;* the rates,

[2]For more detailed discussion see Antonio Ciocco, Sex Differences in Morbidity and Mortality. Quarterly Review of Biology, Vol. 15, Nos. 1 and 2. 1940.

TABLE 3.—Death rates for accidents in childhood by age, sex, and race; and by type of accident; United States, 1939-41. (Average annual death rates[1] per 100,000 population.)

Type of accident (Numbers of International List of Causes of Death, Fifth Revision of 1938)	Nonwhite											
	Under 20 years		Under 1 year		1-4 years		5-9 years		10-14 years		15-19 years	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
ALL ACCIDENTAL DEATHS (169-195)	74.2	36.3	259.1	208.1	66.2	57.9	42.6	26.7	56.2	14.5	98.1	21.1
Railway accidents (except collisions with motor-vehicles) (169)	1.8	0.3	0	0.3	0.2	0.4	0.8	0.3	1.3	0.2	5.1	0.4
Motor-vehicle accidents (170a, b, c, d)	18.3	6.7	6.4	6.3	11.0	7.5	15.5	7.3	14.8	3.9	32.7	8.5
Streetcar and other road-transport accidents (171a, 171b)	0.8	0.1	0	0.3	0.6	0.2	0.6	0.1	1.1	0.1	1.1	0.0
Accidents in mines and quarries (174)	0.2	0	0	0	0	0	0.1	0	0.1	0	0.7	0
Agricultural accidents (175a, b, c)	0.8	0.1	0	0.3	0.2	0.1	0.1	0.1	0.9	0.0	2.1	0.1
Other accidents involving machinery (176)	0.6	0.0	0	0	0.3	0.1	0.1	0	0.3	0.0	1.5	0
Food poisoning (177)	1.1	0.8	7.2	6.0	2.0	1.6	0.7	0.4	0.5	0.2	0.4	0.4
Acute accidental poisoning (except food poisoning) (178, 179)	2.4	2.0	4.7	3.8	9.2	7.1	0.9	0.7	0.2	0.2	0.5	0.9
Conflagration (180)	4.2	4.4	16.1	19.1	9.7	9.8	2.8	2.7	1.3	1.3	2.2	2.5
Accidental burns (except conflagration) (181)	5.9	8.8	20.6	16.4	15.9	21.8	3.2	9.7	1.8	3.2	2.4	2.4
Accidental mechanical suffocation (182)	5.3	4.5	112.9	98.9	0.7	0.2	0.1	0.1	0.1	0	0.4	0
Accidental drowning (183)	13.6	1.2	3.3	1.4	3.6	1.3	7.2	0.8	18.0	1.3	25.5	1.5
Accidental injury by firearms (184)	5.3	1.5	1.1	0.5	2.6	1.6	2.8	1.3	6.8	1.5	9.3	1.6
Accidental injury by fall (186a)	3.0	1.3	16.7	7.9	3.2	2.4	2.1	0.8	2.0	0.5	2.4	0.5
Other accidents	10.6	4.4	70.1	47.0	7.0	3.9	5.4	2.2	7.0	2.0	11.7	2.2
Obstruction, suffocation, or puncture by ingested objects (195d)			24.5	16.7								

[1] Symbol 0 means no death at all; 0.0 death rate less than 0.05.

16.1 for boys and 19.1 for girls, are about three times as high as those for motor-vehicle accidents. In contrast, among white infants the death rates for conflagration are 4.3 and 3.9 respectively, distinctly below the rates for motor-vehicle accidents. The inverse order of fire and automobile hazards in the two racial groups reflects differing risks starting in infant life. The risk of being killed by conflagration (usually as a result of burning houses, inhalation of smoke, and so on) is four to five times higher for the nonwhite infant than it is for the white. (See ratios, nonwhite to white, table 4.)

The sex differences for deaths from conflagration are not consistent and are not statistically significant. This brings up the interesting statistical fact that where accidents, and the deaths resulting from them, are beyond personal control (catyclysm, such as floods, earthquake, conflagration, etc.), there is usually no significant difference between the sexes. In such cases any constitutional difference in susceptibility between the sexes, as well as the normal difference in exposure, is outbalanced. This seems to be the case throughout all the ages of childhood for deaths caused by conflagration, as shown in table 2 for white children. It is also true for the nonwhite children, as shown in table 3, in spite of the fact that the latter exhibit far higher rates than the white. The same holds in both racial groups for motor-vehicle accidents during infancy, when the children are only passive sufferers; in all following age groups, apparent in the preschool and much more so in school-age and adolescent groups, the differences between the male and female rates for motor-vehicle accidents become increasingly significant.

Next in order and still rather high are accidental deaths from *injury by fall.* The death rates are 5.9 and 3.7 per 100,000 white boys and girls respectively; the corresponding rates for nonwhite infants being 16.7 and 7.9. Both race differences and sex differences are distinct and beyond mere chance fluctuations. The explanation can be seen again in the different environmental conditions of the races and the greater liability of male infants.

Other principal causes of accidental deaths for which rates are computed are *food poisoning* and *acute poisoning by gas, solids, or liquids* (except food poisoning). These still play a certain role among all accidental deaths, especially food poisoning among nonwhite infants, but the rates are becoming small and negligible. The absolute figures for deaths from these causes (see tables 5 and 6) show their relative importance. Among the white population of the United States under 1 year of age, there occurred 64 male and 61 female deaths from food poisoning in the 3 years 1939-41; and among the nonwhite population 26 and 22, respectively. These figures give the rates 2.4 and 2.3 respectively among the whites, and 7.2 and 6.0 among the nonwhites.

In conclusion it may be said that the accidental deaths in infancy, though high when compared with other ages of childhood, lose very much in importance when compared with the main causes of infant deaths (premature

TABLE 4.—Ratios of death rates, nonwhite to white; United States, 1939-41.

Type of accident (Numbers of International List of Causes of Death, Fifth Revision of 1938)	Ration: nonwhite to white											
	Under 20 years		Under 1 year		1-4 years		5-9 years		10-14 years		15-19 years	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
ALL ACCIDENTAL DEATHS (169-195)	1.3	1.4	2.1	2.1	1.2	1.4	1.1	1.3	1.4	1.2	1.3	1.1
Railway accidents (except collisions with motor-vehicles) (169)	1.6	1.5	[1]	[1]	0.4	1.3	1.3	1.0	1.2	0.7	2.4	2.0
Motor-vehicle accidents (170a, b, c, d)	0.8	0.7	0.9	0.9	0.7	0.7	0.9	0.8	1.0	0.8	0.8	0.6
Streetcar and other road-transport accidents (171a, 171b)	1.6	0.5	[1]	[1]	2.0	1.0	1.5	0.5	1.6	0.5	1.8	[1]
Accidents in mines and quarries (174)	0.7	[1]	[1]	[1]	[1]	[1]	0.5	[1]	0.5	[1]	0.9	[1]
Agricultural accidents (175a, b, c)	0.8	1.0	[1]	[1]	0.3	0.3	0.2	0.5	0.8	[1]	1.3	[1]
Other accidents involving machinery (176)	1.5	[1]	[1]	[1]	1.0	1.0	0.5	[1]	1.5	[1]	1.7	[1]
Food poisoning (177)	2.8	2.0	3.0	2.6	2.2	1.6	3.5	4.0	5.0	2.0	4.0	4.0
Acute accidental poisoning (except food poisoning) (178, 179)	2.0	2.0	1.7	1.7	2.2	2.2	3.0	2.3	1.0	1.0	0.8	1.5
Conflagration (180)	3.2	4.0	3.7	4.9	2.9	4.3	2.5	2.3	2.6	2.6	4.4	6.3
Accidental burns (except conflagration) (181)	1.9	2.4	2.7	2.6	1.7	2.1	1.9	2.6	1.8	2.5	2.0	2.7
Accidental mechanical suffocation (182)	1.8	2.1	2.0	2.2	1.2	0.5	0.3	1.0	0.5	[1]	2.0	[1]
Accidental drowning (183)	1.5	0.6	1.8	0.9	0.4	0.3	0.9	0.6	2.0	0.7	2.6	1.1
Accidental injury by firearms (184)	1.6	3.0	5.5	[1]	2.6	3.2	1.9	2.2	1.6	3.0	1.5	2.7
Accidental injury by fall (186a)	1.0	1.3	2.8	2.1	1.0	1.2	1.0	1.0	0.8	0.7	0.8	1.0
Other accidents	1.5	1.4	2.1	1.9	1.0	0.8	1.3	1.2	1.3	1.5	1.5	2.0
Obstruction, suffocation, or puncture by ingested objects (195d)			1.2	1.1								

[1] No deaths, or death rate less than 0.05 per 100,000 among whites or nonwhites.

birth, pneumonia and influenza, congenital malformations, injury at birth, diarrhea and enteritis). In 1939-41 accident fatalities constituted only a little more than 2 percent of all deaths in infancy and were not, therefore, among the leading causes of death in this age group.

Fatal Accidents in the Preschool Age

During 1939-41, for the preschool child 1-4 years of age, the average annual death rates for accidents were 56.6 and 41.1 per 100,000 white boys and girls respectively. The distinct sex difference of 15.5 is beyond doubt significant in a strictly statistical sense. If standard errors are computed for the 3-year average on the basis of the huge population of white children of these ages, numbering in the census year of 1940 nearly 4 million of each sex, the difference is almost 17 times its standard error of .934. The corresponding death rates for nonwhite boys and girls are 66.2 and 57.9 respectively, and are based on a population of somewhat above one-half million in each sex. The sex difference among the nonwhite children, 8.3 ± 2.78, is much smaller and not as significant as among white children, but is still beyond the usual limits of chance fluctuations, being 3 times its standard error. The death rates for accidents are somewhat higher for nonwhite children than for white, especially for the girls, but both racial differences, 9.6 ± 2.15 for the boys and 16.8 ± 2.00 for the girls, are obviously significant.

The absolute numbers of accident fatalities, given in tables 5 and 6, also deserve attention since they show in a vivid and realistic manner the lives lost by accidents, which must be called preventable deaths. In this age group during the 3 years 1939-41, there were 6,445 white boys who lost their lives through accident, 4,511 white girls, 1,060 nonwhite boys, and 932 nonwhite girls; altogether practically 13,000 fatal accidents among children 1-4 years of age. Among the white population these deaths constitute 20 percent of all deaths among boys of this age and 17 percent of all deaths among girls; in the nonwhite population they constitute 12 percent of all deaths among both boys and girls. Thus the relative importance of fatal accidents, or their weight among all causes of death, is much greater in the preschool age than in infancy, although the death rates themselves are appreciably lower.

Accident fatalities, one of the leading causes of death among children of preschool age, have gained in importance in recent years principally because other preventable causes of death, the infectious diseases in particular, have decreased at a much faster rate. As a matter of fact, in the 1939-41 period under scrutiny, the death rate for all accidents among white boys (56.6) was almost the same as for pneumonia and influenza (56.7), the

leading cause of death for this age group since the beginning of the century; among white girls the death rate for accidents (41.1) was second only to that for pneumonia and influenza (51.4). Among nonwhite boys the accident death rate (66.2) occupied third place, being exceeded greatly by pneumonia and influenza (140.5), and only slightly by diarrhea and enteritis (66.9); among nonwhite girls the accident death rate (57.9) was second only to pneumonia and influenza (116.9), and exceeded the death rate from diarrhea and enteritis (56.5).

Turning again to the principal causes of fatal accidents, it will be seen from the rate tables 2 and 3 that the rank order for the preschool child is very different from that for the infant. Mechanical suffocation, the principal cause of accidental death in infancy, has almost disappeared. The lead is now taken, among white boys and girls, by *motor-vehicle accidents*, with 15.6 and 11.3 deaths per 100,000 respectively. Among nonwhite boys and girls these rates are lower, 11.0 and 7.5 respectively, and the lead is taken by *accidental burns* with rates of 15.9 and 21.8 respectively. The corresponding rates for accidental burns among white children are 9.2 and 10.3, making this cause of accidental death second highest in the rank order for girls, and third highest for boys.

Accidental burns are practically the only type of accident for which female children have a higher death rate than male. Since this holds true in both racial groups and, as will be seen later, in the following age groups of the school child, the statistical trend must be taken as significant even though the sex differences are not always beyond possible chance fluctuations. That girls of preschool and school age have higher rates for burns than boys may be due to the fact that girls spend more time around the kitchen and laundry than boys do, and for this reason are more exposed to environmental hazards such as boiling water.[3]

Another outstanding accident in this age is *conflagration.* The rates show no consistent sex difference in either race, but they are distinctly higher for the nonwhite than for the white, with 9.7 and 9.8 deaths per 100,000 for nonwhite boys and girls respectively and 3.4 and 2.3 for white respectively. The high rates for the nonwhite, almost three times as high for the boys and more than four times as high for the girls (see ratios, table 4) reflect again, as in the infant year and the following age groups, the greater risk of the nonwhite people from burning houses, smoke inhalation, and so on. These hazards hardly observe any sex distinction.

In almost every other type of accidental death the little boys, 1-4 years of

[3]Collins found very similar results for mortality from burns among white school children in the registration States of 1920 during the period 1921-1927. See: The Health of the School Child. U. S. Public Health Bulletin No. 200, pp 107-109. Dublin and Lotka attribute the greater mortality of girls of preschool age, which they observed among Metropolitan industrial policyholders, more to additional hazards of feminine clothing. See Twenty-five Years of Health Progress, Metropolitan Life Insurance Co., N. Y., 1937, p. 485.

age, exhibit higher rates than the girls. Surprisingly high in the white race are accidental deaths from *drowning*, with 9.6 and 4.2 per 100,000 boys and girls respectively, as compared with 3.6 and 1.3 for the nonwhite group. Since these rates are based on huge population figures for a 3-year period, there is no doubt about their statistical significance; the race differences as well as the sex differences far surpass chance fluctuations. This still holds for the next age group, 5-9 years (see ratios, nonwhite to white, table 4). While greater exposure suggests itself as an explanation for the higher death rates of the male in both racial groups, it is difficult to find any explanation for the higher rates for drowning among white children compared with nonwhite. Of course, for this cause as for some of the others, the statistical results depend on the reliability of the original material, i.e., the medical diagnoses on the death certificates, which cannot be corrected by mathematical methods.

Other important types of accident fatalities in the preschool age are *acute poisoning by gases, solids, or liquids* (except food poisoning), and *injury by fall*. Deaths from *food poisoning* are not as frequent as in infancy. Fatal accidents from acute poisoning by gases, liquids, or solids occur among nonwhite boys and girls (9.2 and 7.1 deaths per 100,000 respectively) more than twice as often as among white (4.1 and 3.3 respectively). For fatalities from falls the preschool children in both races exhibit almost the same rates; for white boys and girls 3.2 and 2.0 respectively, and for nonwhite, 3.2 and 2.4. The sex differences are rather distinct in all these rates and show again the greater liability or exposure of the male child. This is also the case in most of the rarer accidents, the rates for which may be seen in the tables. Thus the only significant exceptions are accidental burns in the preschool and school age. Here, undoubtedly, we see the effect of the different environment of boys and girls.

Fatal Accidents in the School-Age Groups

School age comprises two age groups in our tabulation, 5-9 and 10-14 years. Here the death rates for accidents as a whole, 1939-41, were the lowest of all the ages of childhood. In the age group 5-9 years, there were 39.3 and 20.0 accidental deaths per 100,000 white boys and girls respectively, and 42.6 and 26.7 per 100,000 nonwhite boys and girls. The race differences are not significant in this age, but the sex differences are seen to be significant beyond doubt in both races, when standard errors are computed. The sex difference is still more distinct among the older school children, 10-14 years of age, whose death rates were 40.9 and 12.2 for the white

TABLE 5.—Deaths from accidents in childhood by age, sex, and race, and by type of accident; United States, 1939-41. (Absolute numbers for three years.)

Type of accident (Numbers of International List of Causes of Death, Fifth Revision of 1938)	White											
	Under 20 years		Under 1 year		1-4 years		5-9 years		10-14 years		15-19 years	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
ALL ACCIDENTAL DEATHS (169-195)	34,129	14,916	3,373	2,556	6,445	4,511	5,595	2,745	6,457	1,869	12,259	3,235
Railway accidents (except collisions with motor-vehicles) (169)	671	136	2	1	62	28	88	37	175	41	344	29
Motor-vehicle accidents (170a, b, c, d)	13,198	5,745	200	187	1,772	1,245	2,538	1,283	2,299	789	6,389	2,241
Streetcar and other road-transport accidents (171a, 171b)	315	106	2	0	39	26	57	24	111	34	106	22
Accidents in mines and quarries (174)	211	14	1	0	4	0	27	6	39	4	140	4
Agricultural accidents (175a, b, c)	600	72	1	1	88	31	72	23	173	11	266	6
Other accidents involving machinery (176)	252	32	0	0	34	15	34	7	37	4	147	6
Food poisoning (177)	230	213	64	61	103	108	30	19	16	8	17	17
Acute accidental poisoning (except food poisoning) (178, 179)	716	594	75	60	462	367	39	40	37	23	103	104
Conflagration (180)	813	656	116	101	386	256	156	159	77	75	78	65
Accidental burns (except conflagration) (181)	1,857	2,158	206	167	1,052	1,132	249	518	157	194	193	147
Accidental mechanical suffocation (182)	1,740	1,243	1,570	1,177	70	47	36	8	27	5	37	6
Accidental drowning (183)	5,318	1,225	48	39	1,097	463	1,149	181	1,398	313	1,626	229
Accidental injury by firearms (184)	2,024	301	5	1	109	60	212	76	684	71	1,014	93
Accidental injury by fall (186a)	1,743	616	161	96	363	223	314	110	395	101	510	86
Other accidents	4,441	1,805	922	665	804	510	594	254	832	196	1,289	180
Obstruction, suffocation, or puncture by ingested objects (195d)			560	411								

boys and girls respectively, and 56.2 and 14.5 for the nonwhite. Apart from the wide sex difference in both racial groups in this age, 10-14, nonwhite boys show a distinctly higher rate than the whites while nonwhite girls do not. One might suppose that the nonwhite boys, 10-14 years old, are already engaged with the laboring forces and thus suffer relatively more than the whites from occupational hazards. But an analysis of the single types and causes of accidental deaths throws a different light upon the race differential of the male.

Although at school age the death rates for accidents as a whole are lower than at any other age, accident fatalities represent by far the most important cause of death among school children at the present time. Other leading causes of death, acute infectious diseases and tuberculosis, have decreased substantially during the last decade, but fatal accidents only very little for this age group.[4]

The total number of deaths from accidents, 1939-41, for children 5-9 years of age amounted, among the whites, to 5,595 boys and 2,745 girls and, among the nonwhites, to 861 boys and 546 girls; altogether 9,747 fatal accidents. In the following age group, 10-14 years, the corresponding figures are 6,457 and 1,869 white boys and girls and 1,169 and 304 nonwhite; altogether 9,799 fatal accidents. Thus nearly 20,000 deaths from accidents occurred among children of school age in the 3 years 1939-41. These accident fatalities constitute, in the 5-9 year group, one-third of all deaths among white boys and more than one-fourth among nonwhite boys; almost one-fourth among white girls and one-fifth among nonwhite girls. In the 10-14 year group, the corresponding proportions are somewhat higher for the boys in both races, but distinctly lower for the girls, especially the nonwhite girls. (See table 7.)

Accidents represent the leading cause of death among school children and hence constitute a public-health problem of the first rank. This becomes still more apparent when we compare the other leading causes of death with fatal accidents. The death rates for pneumonia and influenza, second leading cause of death among children 5-9 years old, for the same period are 10.2 and 9.0 for white boys and girls respectively, as compared with accident rates of 39.3 and 20.0. In the white group, the third leading cause of death is appendicitis with the respective rates 8.2 and 6.7. Among nonwhite boys and girls of this age the respective death rates for pneumonia and influenza are 21.2 and 18.1, as compared with 42.6 and 26.7 for accidents. In this group the third leading cause of death is tuberculosis with the rates 16.4 for boys and 14.7 for girls.

[4]The decrease in the leading causes of death, from 1900 to 1940, has been discussed in a former paper. *See* George Wolff: Deaths From Accidents Among Children and Adolescents. The Child, 9:84-86, 1944.

TABLE 6.—Deaths from accidents in childhood by age, sex, and race, and by type of accident; United States, 1939-41. (Absolute numbers for three years.)

Type of accident (Numbers of International List of Causes of Death, Fifth Revision of 1938)	Nonwhite											
	Under 20 years		Under 1 year		1-4 years		5-9 years		10-14 years		15-19 years	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
ALL ACCIDENTAL DEATHS (169-195)	5,976	2,990	932	762	1,060	932	861	546	1,169	304	1,954	446
Railway accidents (except collisions with motor-vehicles) (169)	148	28	0	1	3	7	16	7	28	4	101	9
Motor-vehicle accidents (170a, b, c, d)	1,472	554	23	23	176	120	314	150	307	81	652	180
Streetcar and other road-transport accidents (171a, 171b)	67	10	0	1	10	3	12	2	23	3	22	1
Accidents in mines and quarries (174)	20	0	0	0	0	0	3	0	3	0	14	0
Agricultural accidents (175a, b, c)	66	8	0	1	3	1	3	3	18	1	42	2
Other accidents involving machinery (176)	45	2	0	0	5	1	3	0	7	1	30	0
Food poisoning (177)	91	68	26	22	32	25	14	8	11	5	8	8
Acute accidental poisoning (except food poisoning) (178, 179)	197	168	17	14	147	115	18	15	5	4	10	20
Conflagration (180)	339	363	58	70	155	157	56	56	26	27	44	53
Accidental burns (except conflagration) (181)	479	728	74	60	255	351	65	199	37	68	48	50
Accidental mechanical suffocation (182)	429	368	406	362	11	4	3	2	2	0	7	0
Accidental drowning (183)	1,099	102	12	5	58	21	146	17	374	27	509	32
Accidental injury by firearms (184)	428	120	4	2	41	26	56	27	141	31	186	34
Accidental injury by fall (186a)	243	106	60	29	52	39	43	16	41	11	47	11
Other accidents	853	365	252	172	112	62	109	44	146	41	234	46
Obstruction, suffocation, or puncture by ingested objects (195d)			88	61								

Among older school children, 10-14 years of age, the accident death rate for white boys (40.9) is many times higher than the next most important causes of death; appendicitis (9.0), diseases of the heart (8.8), and pneumonia and influenza (7.0). Among the white girls accidents remain the leading cause of death but the excess over other causes is relatively small owing to the low accident death rate of 12.2. This is followed by heart diseases (9.2), pneumonia and influenza (7.1), and appendicitis (6.9). Among nonwhite children of this age, the difference between accident fatalities and other leading causes of death is again large for the boys, though not quite so enormous as for the white boys, the death rate for accidents (56.2) being two and one-half times as high as that for tuberculosis (22.3), and more than three times as high as that for pneumonia and influenza (17.4). (The death rates for heart diseases and appendicitis are appreciably smaller than any of these.) Among nonwhite girls of this age the story is quite different. Here tuberculosis is by far the main cause of death, with a rate of 39.0 (higher than the rate for nonwhite boys, 22.3), followed at a great distance by pneumonia and influenza (16.3) and only then by accidents (14.5).

This is a very characteristic difference in the mortality patterns of the two racial groups. Tuberculosis today still takes a high toll among the nonwhite people, especially among maturing and adolescent girls, while among the white children tuberculosis, with the rates 2.9 and 4.3 for boys and girls respectively, has almost ceased to be a serious threat.

Details about the principal causes of accidental death among school children can be obtained from the tables. Some of the outstanding facts may be reviewed here. In both age groups of white school children *motor-vehicle fatalities* leads with rates of 17.8 and 9.3 for boys and girls respectively, in the lower age group, and 14.6 and 5.2 respectively, in the higher. The next most important cause of accidental death is *drowning* the rates for which are 8.1 and 1.3 in the 5-9 year group and 8.9 and 2.0 in the 10-14, for white boys and girls respectively. The low rates of the girls for accidental drowning are especially conspicuous and bring to mind the different attitudes of the sexes towards outdoor life in early childhood and the resulting different environmental hazards. These large sex differences are, of course, significant in every sense. The figures show how many school children's lives could be saved by better educational and supervisional measures. The absolute figures for drowning are quite impressive. Among white children, in the period under observation 1,149 boys and 181 girls died by drowning, in the 5-9 year group, and 1,398 boys and 313 girls in the 10-14 group. The corresponding figures for nonwhite children are 146 boys and 17 girls in the 5-9 year group, and 374 boys and 27 girls in the 10-14. Altogether more

than 3,600 school children lost their lives by drowning during 1939-41. (See tables 5 and 6.)

In regard to the race differential for drowning, there is one striking point which should be mentioned. Among the preschool and younger school children the nonwhite show lower death rates than the whites in both sexes, but in the 10-14 year group (and still more so in the following age group) nonwhite boys pay a definitely higher toll for drowning than white boys of the same age (see ratios, table 4). Their death rate of 18.0 per 100,000 is more than twice that of the white boys and, in fact, the principal cause of accident deaths in this group, exceeding even the motor-vehicle death rate of 14.8. This high race differential for drowning is also the main reason why nonwhite boys of this age have a higher total death rate for accidents than white boys. Race differences for the other single causes are small and mostly within the boundaries of chance fluctuation. It appears, therefore, that the increased rate for accidental death among nonwhite boys at these ages may be due chiefly to their choice of recreation (fishing, swimming, boating) or to their places of recreation.

Other more or less characteristic causes of fatal accidents among children are accidental burns, conflagration, injury by fall, and, among the older children, injury by firearms. For these and for some other causes (agricultural accidents, other accidents involving machinery, etc.) the tabulated rates are not very high and may be found in tables 2 and 3. With few exceptions, in both age divisions the females of both racial groups incur fewer risks than the males, the one outstanding exception being *accidental burns*. For this latter cause of accident fatality, the rate for white girls, 5-9 years of age, is 3.8 per 100,000, more than twice that for white boys (1.7); the rate for nonwhite girls is 9.7, more than three times that for nonwhite boys, (3.2). Among the older school children, 10-14 years, the sex difference is in the same direction though less marked. The rates in the white group are 1.0 and 1.3, and in the nonwhite 1.8 and 3.2, for boys and girls respectively. The explanation is obviously the same as that given for preschool children and suggests a need for more specific education and care on the part of mothers regarding this avoidable cause of death. As the children grow older the rates for accidental burns decrease considerably and the unfavorable differential of the girls diminishes. Among adolescents, 15-19 years of age, girls do not suffer more than boys from fatal burns; this holds true for both racial groups.

It should also be mentioned that among older school children, *injury by firearms* becomes a relatively important cause of fatal accidents. Among white children 10-14 years of age, the death rates are 4.3 and 0.5 for boys and girls respectively; and among nonwhites of the same age, 6.8 and 1.5 respectively. This significant sex difference, of course, needs no special

explanation; it is the expression of the greater self-exposure of the male to firearms, which starts in childhood and continues throughout life.

Fatal Accidents in Adolescence

Among adolescent males, 15-19 years, the death rate for accidents as a whole is higher than in any preceding age of childhood except infancy. Not so for the young women. This is in all probability due to the fact that boys are exposed to greater occupational and recreational accident hazards than girls. Although both boys and girls are working during this age period, boys tend to enter occupations where the hazards are greater. In both racial groups the accident death rates of girls 15-19 exceed only those of the older school girls, 10-14 years of age. The death rates are, among the whites, 74.1 and 19.8 for boys and girls respectively and among the nonwhites, 98.1 and 21.1. In this group the racial differences are not very impressive for accidents as a whole although there are some finer and more significant differences for single types of accidents. (See table 4, ratios: nonwhite to white.) Much more impressive at this age are the sex differentials, reflecting the different habits of the sexes when reaching puberty and entering the hazards of occupational life. The white males suffer almost four times, and the nonwhite nearly five times, as many fatal accidents as the respective females; these are the highest sex differences dealt with in this study.

Accident fatalities today represent the leading cause of death among white youths 15-19 years of age, and particularly among the boys; among the nonwhite, deaths from tuberculosis still rank much higher than deaths from accidents for the females, while for males the rates for fatal accidents and for tuberculosis are about equal. During 1939-41, there occurred among white males 12,259 deaths from accidents, or 43 percent of all deaths in this group; among white females 3,235 deaths from accidents were reported, or 17 percent of all deaths, with tuberculosis following closely. The corresponding numbers of accidental deaths among the nonwhite were 1,954 male and 446 female, or 26 and 5 percent, respectively, of all deaths. The total in both races and both sexes amounted to almost 18,000 deaths from accidents.

The rank of the leading causes of death will be seen best from the following summarizing table where the death rates per 100,000 are shown by race and sex in the order of the male rates. The rank order for the females is shown in brackets.

This table brings out clearly the tremendous weight that accident carries among causes of death for the white male 15-19 years old. The death rate

(74.1) covers more than two-fifths of all deaths in this group and is nearly six times that of the second most important cause, heart disease, with a rate of 12.7. Among nonwhite boys the accident death rate (98.1) is higher but does not constitute much above one-fourth of all deaths, tuberculosis with a rate of 97.2 having almost the same weight. In the white group the tuberculosis rate is only 10.7 for boys and 18.9 for girls. It is worth mentioning, in a sociographic picture of the causes of death among the races and sexes, that in the nonwhite group homicide, with a rate of 36.4, enters as the third leading cause of death among boys. Compared with this the corresponding rate among the whites (2.1) is negligible.

Rank of 6 leading causes of death for white and nonwhite youths, 15-19 years of age

Average annual death rate by sex per 100,000 population, United States, 1939-41

Leading causes of death in order of the rates for the white male (rank of female rates in brackets)	White		Leading causes of death in order of the rates for the nonwhite male (rank of female rates in brackets)	Nonwhite	
	Male	Female		Male	Female
Accidents	74.1	19.8 (1)	Accidents	98.1	21.1 (5)
Heart diseases	12.7	11.2 (4)	Tuberculosis	97.2	159.7 (1)
Appendicitis	11.2	6.6 (6)	Homicide	36.4	15.2 (6)
Tuberculosis	10.7	18.9 (2)	Pneumonia & influenza	30.0	30.9 (3)
Pneumonia & influenza	10.4	7.5 (5)	Heart diseases	15.7	21.6 (4)
Diseases of pregnancy	—	11.3 (3)	Diseases of pregnancy	—	62.3 (2)

In the nonwhite group, the death rate from homicide is high at this age even among girls (15.2) and enters the leading causes of death at the sixth place. The corresponding rate for white girls is only 1.0. The total accident death rate is slightly higher among nonwhite girls (21.1) than among the white (19.8). However, the relative importance of accidents among all causes of death at this age is very much greater among the whites. Among white females, 15-19 years old, 1 death out of 6 is caused by accident, in contrast to 1 out of 20 among the nonwhite females. Other causes of death play a greater role among the nonwhite than among the white, as can be seen from the above rank. By far the greatest killer among nonwhite young women is still tuberculosis, probably augmented by childbearing. The tuberculosis death rate (159.7) is nearly eight times the accident rate in the same racial group (21.1), and more than eight times the tuberculosis rate among young white females (18.9). Therefore the main public-health

problem among nonwhite girls entering the childbearing age is still tuberculosis, while among white girls and even more so among white boys, accident is the leading cause of death.

Turning again to the single types of accidents, it will be seen from tables 2 and 3 that by far the most important type at this age is *motor-vehicle accidents,* especially in the white group. More than one-half the accidental deaths among white boys result from this cause, and among white girls, more than two-thirds. For 1939-41 the death rates are 38.6 and 13.7 respectively. Among the nonwhites the corresponding rates are 32.7 and 8.5; appreciably lower than the rates among the whites. (See ratios, table 4.) In both racial groups the large sex difference is very significant. Another traffic hazard, death from *railway accidents,* is also noticeable in this age. To be sure, the rates are low in comparison with motor-vehicle accidents, but are much higher than in any preceding age of childhood. It should also be noticed that for this type of accident the death rates for the nonwhite, 5.1 for males and 0.4 for females, exceed those for the whites, 2.1 and 0.2 respectively. This is especially true for the male and may be due to the greater occupational exposure of the nonwhite laborers in railroad jobs.

Second in rank among the principal causes of accident fatalities for male youths is *drowning,* the death rates among the white group, 9.8 and 1.4 for boys and girls respectively, being far behind those for motor-vehicle accidents. In the nonwhite group, the rate for boys (25.5) is rather close to the leading cause, motor-vehicle accidents, while the rate for girls (1.5) is as low as among the whites. The sex differences are obvious and easily understood. But why at this age, as in the preceding age, nonwhite boys should incur a much higher risk of accidental drowning than white boys is not so easily explained, especially since in the preschool and early school age the reverse was true, namely a higher death rate for drowning among the white children.

The third cause of fatal accidents among adolescent males is *injury by firearms.* The death rates among the whites are 6.1 and 0.6 for boys and girls respectively, and among the nonwhites 9.3 and 1.6. The sex differences are high as is to be expected since it is especially the growing boy who plays with his father's unprotected firearms and often enough causes minor or major accidents. The actual numbers of persons 15-19 years old killed this way during 1939-41 are 1,014 white boys and 93 white girls, and 186 and 34 nonwhite boys and girls respectively. For all ages under 20 years, the numbers killed by firearm accidents during 1939-41 total 2,452 boys and 421 girls. (For more detailed figures by age and race see tables 5 and 6.) This loss of young human life under peacetime conditions is considerable and could have been prevented in the great majority of cases by proper education and better care on the part of parents and the youngsters. The human tragedies reflected here cannot be evaluated by figures.

TABLE 7.—Deaths and death rates from all causes and from accidents per 100,000 population, and percentage of accidental deaths among all deaths in childhood by age, sex, and race; United States, 1939-41.

Age groups (Years)	White male					White female				
	Total deaths		Accidental deaths		Percentage of accidental deaths	Total deaths		Accidental deaths		Percentage of accidental deaths
	Number in 3 years	Average annual rate	Number in 3 years	Average annual rate		Number in 3 years	Average annual rate	Number in 3 years	Average annual rate	
Under 20	248,623	409.8	34,129	56.3	13.7	183,843	311.8	14,916	25.3	8.1
Under 1	153,744	5,650.9	3,373	124.0	2.2	114,377	4,375.5	2,556	97.8	2.2
1-4	32,645	286.8	6,445	56.6	19.7	26,906	245.3	4,511	41.1	16.8
5-9	16,702	117.3	5,595	39.3	33.5	12,102	88.0	2,745	20.0	22.7
10-14	17,048	108.1	6,457	40.9	37.9	11,328	74.1	1,869	12.2	16.5
15-19	28,484	172.1	12,259	74.1	43.0	19,130	117.0	3,235	19.8	16.9
	Nonwhite male					Nonwhite female				
Under 20	59,785	742.2	5,976	74.2	10.0	51,444	624.6	2,990	36.3	5.8
Under 1	36,785	10,226.3	932	259.1	2.5	28,873	7,886.3	762	208.1	2.6
1-4	8,669	541.7	1,060	66.2	12.2	7,647	475.0	932	57.9	12.2
5-9	3,236	160.0	861	42.6	26.6	2,789	136.4	546	26.7	19.6
10-14	3,651	175.5	1,169	56.2	32.0	3,218	153.3	304	14.5	9.4
15-19	7,444	373.6	1,954	98.1	26.2	8,917	421.5	446	21.1	5.0

Other important causes of accidental death in the 15-19 year group are *injury by fall, agricultural accidents, accidental burns,* and among the nonwhites, *conflagration.* The death rates for these accidents, and for the other types specified in the tables, are comparatively low. It may be mentioned that in this age group, for the first time since infancy, the girls do not show higher death rates for accidental burns than the boys. They seem to have learned how to avoid these hazards of the home environment which in early childhood destroyed quite a few human lives. For white females, 15-19 years old, the death rate for burns is only 0.9, which is distinctly lower than that for the males (1.2); for nonwhite females the rate (2.4) is exactly the same as for males. Regarding death from conflagration, no significant or consistent difference between the sexes is apparent in our figures, in this or in any other age group of childhood, as we have already stated in discussing the preceding ages. Where the hazards are more or less beyond immediate control different sex susceptibilities or behaviors do not essentially influence the fatal results of a catastrophe, such as a huge fire—the 1944 circus fire at Hartford may be recalled—a flood cataclysm, or an earthquake.

In the final table, number 7, are given total deaths and death rates, accident deaths and rates, and the proportions of accident fatalities among all deaths by age, sex, and race. These show in summary form the loss of life through accidents in childhood. These losses are preventable in most part by proper education of adults regarding safety measures at home and at work, close supervision of children at play, public attention and sanitary engineering, better control of water roads and traffic highways, and by strict enforcement of child-labor laws and other necessary regulations. All these arguments and possibly others make the campaign against accidents a public-health problem of the first rank.

SUMMARY

1. Age differential of accidental deaths and relative importance of accidents as cause of death among different age groups in childhood.

The death rates for accident are highest in infancy, lower in the preschool, and lowest in the elementary-school age; they rise again in adolescence with the beginning of occupational life. The high rates in the first year of life are due largely to mechanical suffocation which hardly plays any part in the

following ages of childhood; another important cause of fatal accidents in infancy is obstruction, suffocation, or puncture by ingested objects. Although the total death rate for accidents is high in infancy when compared with other age groups, it loses much of its significance through the greater prevalence of other causes of death at this age (especially premature birth, pneumonia and influenza, congenital malformations, injury at birth, and diarrhea and enteritis).

In preschool age, school age, and adolescence accidents become increasingly predominant because of the great decline in deaths from tuberculosis and acute infectious diseases in the last decades, during which time accident fatalities as a whole have decreased relatively little. After infancy the most important single causes of accidental deaths in childhood are motor-vehicle accidents, drowning, burns, injuries by firearms, and injuries by fall.

2. Race differential in accident fatalities.

The difference between the accident death rates for white and nonwhite children is not very conspicuous, unlike some other causes of death (tuberculosis, syphilis, malaria, pneumonia and influenza) which are much more prevalent in the nonwhite races. It is only in the infant year that nonwhite children suffer twice as high death rates from accident as white children; in all other age groups of childhood the ratios, nonwhite to white, range between a minimum of 1.1 and a maximum of 1.4. However, there are quite a few race differentials of varying degrees and in different directions, for single types of accidents. Motor-vehicle accidents, for instance, occur consistently more often among white children of all ages. The same is true for accidental drowning among the preschool and younger school children. Nonwhite children of this age suffer only a little more than one-half the death rates of the white children for drowning, while nonwhite boys of 10-14 and 15-19 years of age experience more than twice as many deaths from this cause as do white boys. A consistently higher death toll is paid by nonwhite children in all ages for food poisoning, conflagration, and accidental burns, and, to a lesser degree, for other accidental poisoning and for injuries by firearms. The ratios of the death rates, nonwhite to white, are shown in a special tabulation corresponding to the death-rate tables of the two racial groups.

3. Sex differentials in accident fatalities.

Differences between the sexes for fatal accidents are more outstanding than those between the races. These reflect differing risks, behaviors, and susceptibilities of the sexes that may be inborn or acquired. The boys are more daring and even foolhardy; the girls are more timid and approach maturity earlier, both physically and mentally. The greater mortality of the male starts in infancy. For most causes of accident the boys exhibit significantly higher death rates than the girls, as is the case for most other causes

of death. There is one characteristic exception, reflecting the greater environmental risk of the girls at home during the preschool and school age, and that is accidental burns. Only in a few types of accidents are the rates about equal.

According to the sex differences accidents may be grouped as follows:

a Accidents showing a higher death rate for the male (motor-vehicle and other traffic accidents except in the first year of life, drowning, injury by firearms, injury by fall, mechanical suffocation, agricultural accidents).

b Accidents showing a higher death rate for the female (accidental burns).

c Accidents showing no significant sex differential (food poisoning, other accidental poisonings, conflagration, motor-vehicle accidents in infancy when the children are passive participants only). In all these types the accident represents more or less an event of "force majeure" transcending the inborn differences of the sexes as well as different exposures at work and at play.

Such grouping of accidental fatalities according to the physiological and psychological behavior of the sexes suggests methods of prevention by special training and education. The general importance of accident prevention in all walks of life, domestic and industrial, has been stressed by numerous and illuminating publications of the National Safety Council. In this investigation additional emphasis has been put on accident fatalities of children by age, race, and sex. The increasing weight of accidents as a leading cause of death in childhood, from 1 through 19 years of age, has been demonstrated by large figures for a 3-year period, and the more significant race and sex differences, beyond the probable limits of chance fluctuations, for the principal types and causes of accidental death have been underlined.

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